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Department of Energy
Nevada Operations Office
P. O. Box 98518
Las Vegas, NV 89193-8518

Mr. Jonathan Weisgall
1300 Nineteenth Street, N.W.
Washington, DC 20036

NOV 16 [illegible]

Dear Mr. Weisgall:

This responds to your March 18, 1987, letter relative to bioassay and scientific follow-on work at Bikini.

As stated in my interim response of April 10, and recently affirmed at our October 14 Marshall Islands Planning Group meeting, DOE strongly advocates a whole body counting/urine analysis program for people returning to work and live on Bikini Atoll. Attachment 1 is a Five-Year Plan prepared by BNL which details their recommendations and estimates costs at about $1 million annually, exclusive of any required vessel support. Please accept this plan as a recommendation and not as a commitment by DOE to manage the program. Our suggestion has been that this should be addressed as a component of the overall resettlement program.

Attachment 2 is a Five-Year Plan drafted by LLNL as to their recommendations for scientific follow-on to track environmental programs in progress. Again, we view this as a suggestion which might be considered by the Bikinians as part of the overall resettlement plan. Dr. Robison's Plan suggests a total program for the Marshall Islands, however, the Bikini portion is readily distinguishable. This also is not a commitment on behalf of DOE, rather it should be received as an indicator to the Bikinians and RMI Government as to what may be desirable as a follow-up to work currently conducted by LLNL, BARC, or both. Dr. Robison's cost estimates are $1,250K annually for the Bikini portion of the program.

I hope this satisfactorily addresses your inquiry. Let me know if further clarification is required.

Sincerely,

Original Signed By
HARRY U. BROWN

Harry U. Brown
Assistant for
Off-Continent Operations

Enclosures:
As stated

cc w/encls:
J. E. Rudolph, Dir. of Program Support,
MA, HQ (DP-224) GTN
Kittie Baier, Princ. Dep. Asst. Secy.,
Territorial & Intnatl. Affairs, DOI,
Washington, DC

John Rudolph's files
Letter files
Letters Marshall Islands 1987

attachment 1

BROOKHAVEN NATIONAL LABORATORY
ASSOCIATED UNIVERSITIES, INC.
Upton, Long Island, New York 11973

Safety & Environmental Protection Division

(516) 282- 4214
FTS 666-

June 30, 1987

Mr. Harry U. Brown
Assistant to the Manager
for Off-Continent Operations
Department of Energy
Nevada Operations Office
P. O. Box 14100
Las Vegas, NV 89114-4100

Dear Mr. Brown:

This is in response to your May 7, 1987, letter to Ed Lessard requesting a five year radiological safety plan for workers and Bikinians who would be potentially exposed during Bikini resettlement. Ed has become so involved in local operational safety work that he will have little time for the Marshall Islands project for the immediate future. However, we have his expertise here and will, of course, call upon him occasionally as needed.

Fortunately, we have Dr. Casper Sun here now and we plan to assign him to the project full time to pick up Ed's former responsibilities. Casper, as you know, was working with the Marshall Islands project in the early 80's and went on to complete his very excellent Ph.D. thesis on "Evaluation and Development of Plutonium Metabolic Model for Systemic Retention and Excretion." This document is now the authoritative work in the field and makes Casper a unique asset to the program.

The attached draft of a program plan has been developed with the help and input not only of Ed Lessard, but also the following members of our staff who have had and will continue to play important rolls in the program:

Dr. Sujit Banerjee
Mr. Charles B. Meinhold
Mr. Robert Miltenberger
Dr. Anant Moorthy
Mr. Carl Schopfer
Dr. Casper Sun

We hope this plan meets with your approval. Should you require further information or wish to discuss the plan, please feel free to call me, Charles Meinhold, or Ed Lessard.

Sincerely,

J. W. Baum, Head
Research Section

JWB:stc

Enclosure

Copy to: E. Lessard
C. B. Meinhold
R. Setlow
W. Sherry

Five Year Radiological Safety Plan For The Returning Bikini Population And The Workers At The Eneu Base Camp Facilities

Introduction

Brookhaven National Laboratory's Safety and Environmental Protection Division (S&EP) has conducted the Marshall Islands Radiological Safety Program since 1974. A radiological safety program for returning Bikinians and those involved in the reconstruction of Bikini Atoll includes whole body counting, excreta analyses, external radiation measurements and dose assessment. The Five Year Radiological Safety Plan can be carried out by the S&EP Division as given in the following proposal.

Goals

The goals of the Five Year Radiological Safety Plan are (1) to determine the committed dose equivalent to members of the returning Bikini population and workers at the Eneu Base Camp, (2) to define trends in intake and uptake with emphasis on the early detection of increased body burdens, (3) to apply models for plutonium dose estimation, (4) to establish the dosimetric impact of plutonium at Bikini Atoll, and (5) to document that both internal and external exposures are within acceptable limits as prescribed in DOE Order 5484.

Program

The proposed Five Year Plan is designed to document the radiological impact of the environment on people living and working at Eneu and Bikini. It is expected that the primary contribution to whole body dose will be from ^{137}Cs (1). Therefore, to gain a timely estimate of body burdens, field trips will be conducted annually for the purpose of whole body counting and excreta sample collection. Bioassay of ^{137}Cs and ^{90}Sr will complement field measurements as per our earlier experience (2). It is essential to examine other potential contributions to dose at Bikini, such as the external exposure levels and Pu uptake. Specifically, whole body and skin external exposures to gamma and beta radiation should be documented to establish that levels are within DOE guidelines. The effective committed dose equivalent from plutonium is currently characterized to have been 500 mrem per year of residence at Bikini during the 1970's. The magnitude of future plutonium uptake must

be determined in order to document conformance to established limits. Accordingly, Pu bioassay will be performed.

There are three radiological safety issues that the Five Year Radiological Safety Plan will address. The first is the dosimetric impact of ^{137}Cs. It is expected that the actions taken on Bikini prior to resettlement (3) should substantially reduce cesium uptake. Radiological progress of the resettlement will be monitored by whole-body counting in the field. This will be supported by bioassay measurements from samples collected at regular intervals. A base line measurement is imperative in order to have a basis for comparison. Members of the Bikini population or workers at Eneu who have not been whole-body counted since 1983 should participate. Thereafter, an annual measurement program will be implemented to document any change in body burdens.

The second radiological safety issue is the dosimetric impact of plutonium. The fission track technique developed at Brookhaven allows accurate measurement of as little as 100 aCi of ^{239}Pu in a urine void of 600 ml. This allows documentation of effective committed dose equivalent levels of as low as 50 mrem. The dosimetric impact of plutonium at Bikini must be established before making conclusions relative to acceptable guidelines. The fission track method is sensitive enough to allow us to make this determination. To place boundary conditions on plutonium intake, fecal and urinary bioassay samples will be collected. This will help to justify a link to uptake assumptions in the current models. Automation of the method will allow a larger sample output.

The third issue is the ambient external radiation levels at Bikini. External gamma and beta exposures will be measured to document that whole-body, extremity and skin doses are within DOE limits. This aspect of the program is expected to last only one year, as the levels are not expected to change unless the topsoil is physically removed. We will perform TLD measurements corresponding to living patterns, including selected surface soil and living quarters measurements. In addition, a high pressure ionization chamber will be used to map larger areas.

In keeping with the desire to provide a well-documented program the laboratory assays and field measurements will be under strict quality control. A second analytical laboratory will be contracted to provide spiked urine samples for quality control.

To provide a balanced approach to dose assessment the interpretation of results will be based on appropriate intake, uptake, retention and excretion models.

Estimated Costs ($1000s)

	FY '88	FY '89	FY '90	FY '91	FY '92
Laboratory based bioassay	473	499	526	556	585
Whole-body counting	434	457	481	509	537
Capital equipment	168	0	0	0	0
Total	1,075	956	1,007	1,065	1,122

References

(1) Dietary radioactivity intake from bioassay data: A model applied to Cs-137 intake by Bikini Islands residents, E. T. Lessard, R. P. Miltenberger, and N. A. Greenhouse, Health Physics 39, 177-183, 1980.

(2) Bikini Atoll Rehabilitation Committee, Report No. 5, March 31, 1987, Department of the Interior, Office of Territorial and International Affairs.

(3) Bikini Atoll Rehabilitation Committee, Report No. 4, March 31, 1986, Department of the Interior, Office of Territorial and International Affairs.